

AD-A234 871



2

DODPOPHM/USA/DOD/NADTR91102

PERFORMANCE ORIENTED PACKAGING TESTING
OF
PA92 METAL AMMO CONTAINER
FOR
PACKING GROUP II
SOLID EXPLOSIVE MATERIALS

Author:

BILLIE LANDSTROM

Performing Activity:

NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA 47522-5000

FEBRUARY 1991

DISTRIBUTION STATEMENT A
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED

DTIC
ELECTE
APR 18 1991
S B D

Sponsoring Activity:

NAVAL WEAPONS STATION EARLE
PROGRAM MANAGEMENT OFFICE - C11
COLTS NECK, NEW JERSEY 07722-5000


DTIC FILE COPY

91 4 17 004

Prepared by:


Billie Landstrom

Reviewed by:


Richard Sanders

Reviewed by:


R.F. Karcher

Approved by:


C.D. Robinson

REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION/AVAILABILITY OF REPORT UNLIMITED DISTRIBUTION		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE NONE					
4 PERFORMING ORGANIZATION REPORT NUMBER(S) DOD/OPHM/USA/DOD/NADTR			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
6a NAME OF PERFORMING ORGANIZATION Naval Weapons Support Center		6b OFFICE SYMBOL (If applicable) 5053	7a NAME OF MONITORING ORGANIZATION		
6c ADDRESS (City, State, and ZIP Code) Crane, IN 47522			7b ADDRESS (City, State, and ZIP Code)		
8a NAME OF FUNDING/SPONSORING ORGANIZATION Naval Weapons Station Earle		8b OFFICE SYMBOL (If applicable) 8021	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c ADDRESS (City, State, and ZIP Code) Colts Neck, NJ 07722-5000			10 SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO	TASK NO
			WORK UNIT ACCESSION NO		
11 TITLE (Include Security Classification) POP Testing of PA92 Metal Ammo Container					
12 PERSONAL AUTHOR(S) Billie Landstrom					
13a TYPE OF REPORT POP Test Report		13b TIME COVERED FROM _____ TO _____		14 DATE OF REPORT (Year, Month, Day) February 1991	
15 PAGE COUNT 11					
16 SUPPLEMENTARY NOTATION					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	PACKAGING, POP Test, PA92 Metal Ammo Container, HM-181A Test		
19 ABSTRACT (Continue on reverse if necessary and identify by block number) Qualification tests were performed to determine whether the reusable PA92 Metal Ammo Container meets the Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods. The container loaded to a gross weight of 86 pounds successfully met the requirements and retained its contents throughout the test.					
20 DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a NAME OF RESPONSIBLE INDIVIDUAL Billie Landstrom			22b TELEPHONE (Include Area Code) 812-854-1025		22c OFFICE SYMBOL 5053

INTRODUCTION

The PA92 Metal Ammo Container with a dummy load of 55 pounds enclosed, and an overall weight of 86 pounds, was tested to ascertain whether this standard container would meet the requirements of Performance Oriented Packaging (POP) as specified by the United Nations (UN) Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9. A Base Level Vibration Test was also conducted in accordance with the proposed rulings specified in the Department of Transportation's (DOT) Performance Oriented Packaging Standards HM-181, and Requirements for Explosives HM-181A. The objectives were to evaluate the adequacy of the container in protecting explosive materials which are secured with appropriate dunnage.

TESTS PERFORMED

1. Stacking Test

This test was performed in accordance with ST/SG/AC.10/1, Chapter 9, Paragraph 9.7.6. Four different containers were used, each subjected to a stack weight of 1,702 pounds (16 feet). The test was performed for 24 hours. After the allowed time, the weight was removed and the containers examined. Any leakage, deterioration, or distortion which could adversely affect transport, reduce strength or cause instability in stacks of packages was considered cause for rejection.

2. Drop Test

This test was performed in accordance with ST/SG/AC.10/1 Chapter 9, Paragraph 9.7.3. Six different containers were used, three for each drop. The drops were performed from a height of 4 feet. The first drop (using three different containers) was conducted in a manner that would allow the container to strike the test surface diagonally on the chime of the lid or top. The second drop (using the other three samples) allowed the container to strike the test surface on the bottom chime or edge. This test was performed at ambient, $+70 \pm 20^{\circ}\text{F}$ temperature. The contents of the container should be retained within its packaging and exhibit no damage liable to affect safety during transport.

3. Base Level Vibration Test

This test was performed in accordance with Part 173, Appendix C, Docket No. HM-181, Notice No. 87-4, Federal Register/ Vol. 52, No. 215/Friday, November 6, 1987/Proposed Rules. Four sample containers were filled and closed for shipment using inert 2.75" warheads. Two containers were loaded with simulated M267 Practice 2.75" Warheads. The other two containers were loaded with simulated M257 Rocket Flare 2.75" Warheads. Each container was placed on a vibrating platform with a vertical amplitude (peak-to-peak displacement) of one inch. The container was not

restrained during vibration except by a fence attached to the test surface to prevent it from falling off the table. Each container was tested for 60 minutes in its normal shipping position. The vibratory input to the container was at a frequency that caused the container to be raised from the vibrating platform to such a degree that a piece of material of approximately 1/16" (1.6mm) thickness could be passed between the bottom of the container and the platform.

PASS/FAIL (UN CRITERIA)

The criteria for passing the stacking test is outlined in Paragraph 9.7.6.3 of ST/SG/AC.10/1 and states the following: "No test sample should show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages."

The criteria for passing the drop test is outlined in Paragraph 9.7.3.5 of ST/SG/AC.10/1 and states the following: "Where a packaging for solids undergoes a drop test and its upper face strikes the target, the test sample passes the test if the entire contents are retained by an inner packaging or inner receptacle (e.g., a plastic bag), even if the closure is no longer sift-proof."

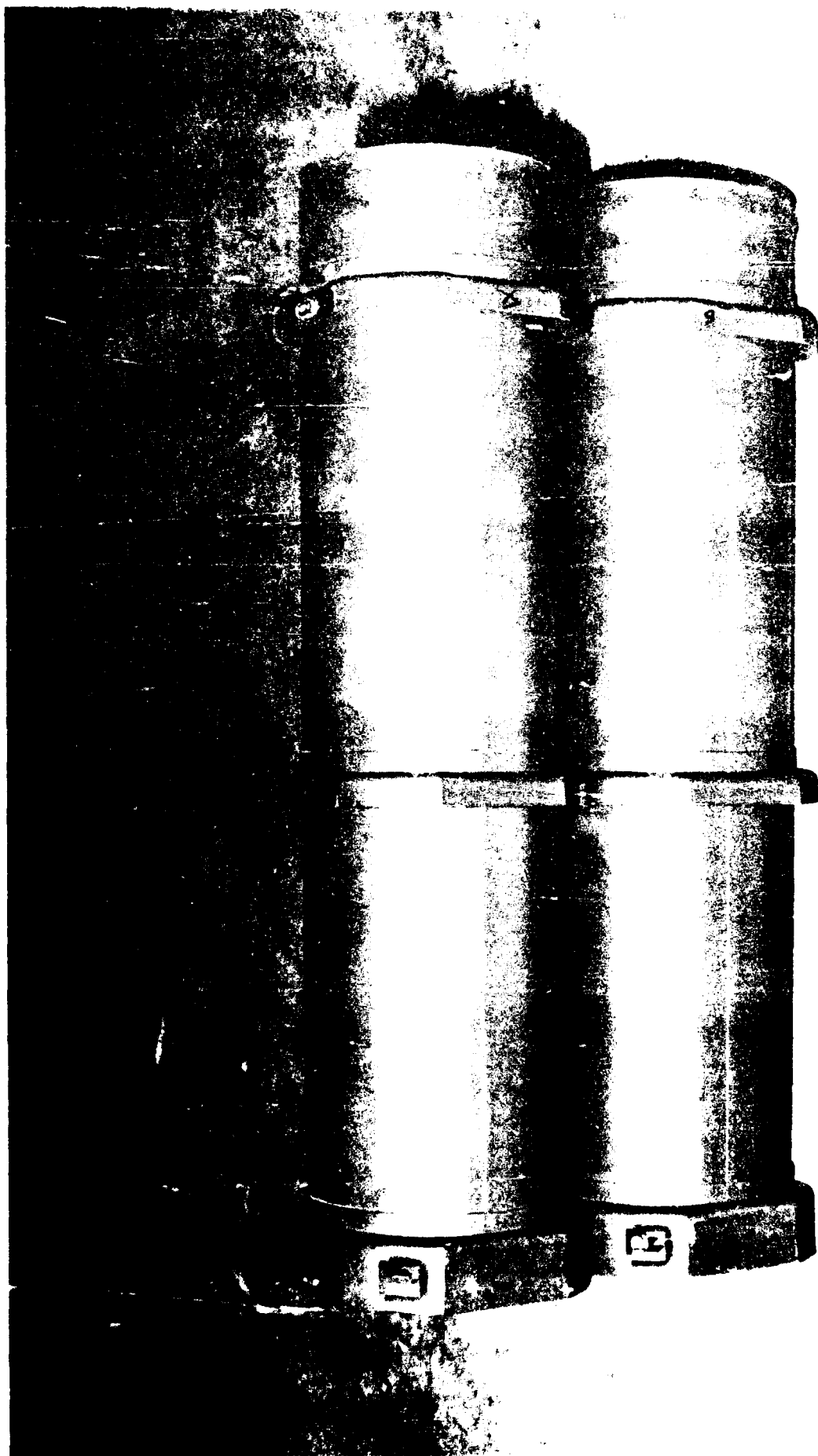
PASS/FAIL (HM-181 CRITERIA)

The criteria for passing the Base Level Vibration Test is outlined in Part 173, Appendix C, Paragraphs 4 and 5, Docket No. HM-181, Notice No. 87-4, Federal Register/Vol. 52, No. 215/ Friday, November 6, 1987/Proposed Rules, and states the following: "Immediately following the period of vibration, each package shall be removed from the platform, turned on its side and observed for any evidence of leakage. Rupture or leakage from any of the packages constitutes failure of the test."

TEST RESULTS

1. **Stacking Test**
Satisfactory.
2. **Drop Test**
Satisfactory, see Figure 1.
3. **Base Level Vibration Test**
Satisfactory with no leakage.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



DISCUSSION

1. Stacking Test

The stacking test was performed with a load of 1,700 pounds for 24 hours. Each container was visibly checked after the 24 hour period was over. There was no leakage, distortion, or deterioration to any of the containers as a result of this test.

2. Drop Test

After each drop, the container was inspected for any damage which would be a cause for rejection. Final inspection indicated damage was minimal with only minor denting noted, particularly on the edge or chime impacted, Figure 2. All six containers remained intact and serviceable on completion of the tests. The standard wire seal (Drawing 19200-8794342) used to secure the container also remained intact during the entire test. An internal pressure test at the end of the series of drops was conducted and the container still maintained an internal pressure of 3.00 PSIG for 30 minutes.

3. Base Level Vibration Test

Immediately after the vibration test was completed, each container was removed from the platform and observed for any evidence of leakage. The latch remained intact and there was no evidence of leakage or loss of contents.

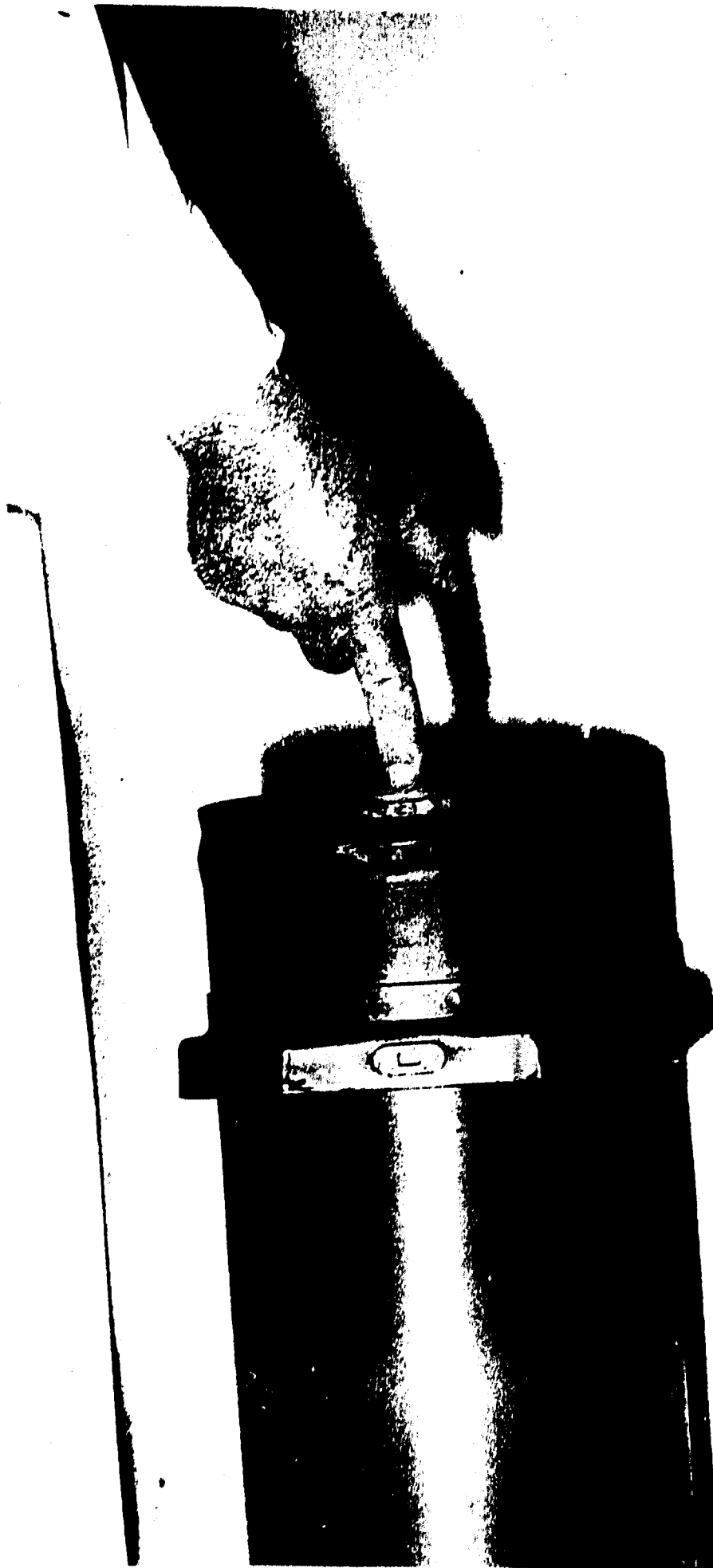


FIGURE 2 - SLIGHT BUCKLING OF SIDESHELL OF
CONTAINER AFTER A DROP FROM A HEIGHT OF
FOUR FEET.

REFERENCE MATERIAL

United Nations "Recommendation on the Transportation of Dangerous Goods", ST/SG/AC.10/1, Revision 6

Docket No. HM-181, Notice No. 87-4, Federal Register/Vol. 52, No. 215/Friday, November 6, 1987/Performance Oriented Packaging Standards; Proposed Rulemaking

Docket No. HM-181A; Notice No. 90-5, Federal Register/Vol. 55, No. 85/Wednesday, May 2, 1990/Requirements for Explosives; Proposed Rulemaking

DISTRIBUTION LIST

Commanding Officer
Naval Weapons Support Center
Code 5053
Crane, IN 47522-5050

Commanding Officer
Naval Weapons Station Earle
Code 403
Coltsneck, NJ 07722-5000

Defense Technical Information Center (2 copies)
ATTN: DTIC/FDA (Virginia Guidi)
Bldg. 5, Cameron Station
Alexandria, VA 22304-6145

Headquarters, Military Traffic Management Command (2 copies)
ATTN: MTMC/MT-SS, James Gibson
5611 Columbia Pike
Falls Church, VA 22041-5050

TEST DATA SHEET

Container: PA92 Metal Ammo Container	
Type: 1A2	UN Code: See Table
Specification Number: DWG 19200-9331197	Material: Steel
Capacity: 39 kg (86.0 pounds)	Dimensions: .94 m (L) x .23 m (W) x .23 m (H) (36.88" L x 9.24" W x 9.24" H)
Closure (Method/type): Removable lid	Tare Weight: 12.71 kg (28.00 pounds)
Additional Description: This is a reusable steel shipping and storage container [NSN 8140-01-024-4328] with a removable cover.	
----- PRODUCT(S): See Table	
Name: See Table	
United Nations Number: See Table	
United Nations Packing Group: II	
Physical State: Solid	
Vapor Pressure (Liquids Only): N/A At 50°C: N/A At 55°C: N/A	
Consistency/Viscosity: N/A Density/Specific Gravity: N/A	
Amount Per Container: Four warheads	
Net Weight: See Table	
----- TEST PRODUCT(S):	
Name: Inert 2.75" Warheads	Physical State: Solid
Size: Various lengths x 2.75" Diameter	Quantity: Four (4) Warheads
Density/Specific Gravity: N/A	
Dunnage: PPP-C-1752 Foam Polyethylene	
Gross Weight: 39 kg (86.0 lbs.)	

TABLE I

DODIC OR NALC	NSN	HM ITEM	TYPE	PACKING DWG	HAZARD CLASS	UN NO.	WGT KG
D662	1320-01-231-7231	M188A1	CHG	9331255	1.3C	0242	32.69
H813	1340-01-330-6687	M257	FLARE	3235AS200	1.3G	0335	32.87
H823	1340-01-313-5515	M261	HE	3097AS200	1.1D	0286	38.32
H873	1340-01-313-5516	M267	PRAC	3096AS200	1.3G	0016	38.32